

**IN THE UNITED STATES PATENT & TRADEMARK OFFICE**

In Re Patent Application of: :

*Kenneth A. Windhorst et al.* :

U.S. Serial No. 10/635,983 : Examiner: K.J. Puttlitz

Filed August 7, 2003 : Group Art Unit: 1621

Docket No. C-7220 (CEL-06-7) :

For: PROCESS FOR PREPARING ORGANIC :  
COMPOUNDS HAVING IMPROVED  
COLOR CHARACTERISTICS ..

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Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

DECLARATION UNDER 37 CFR §1.132

Sir:

Kenneth Allen Windhorst, co-inventor of the subject matter of the above noted patent application (sometimes referred to hereafter as the "Subject Invention"), makes the following statements in support of patentability:

1. I, Kenneth Allen Windhorst, was awarded Bachelor of Science and Master of Science degrees from Texas A&M University in Chemistry and Physical Chemistry, respectively. I have worked in the chemical industry for more than 30 years and I am familiar with processes such as oxidation,

carbonylation and the like, as well as associated features of such processes, including purification by distillation and so forth.

2. I am advised by Counsel that the claims have been rejected over United States Patent No. 3,214,347 to *Grekel et al.* and I am familiar with that patent. I further understand that the claims to the Subject Invention have been amended to recite a process for making organic compound/water mixtures to form a mixed solution having a consistent concentration of water. I am advised by Counsel that amended Claim 1 is representative:

1. A process for preparation of a color stable organic compound/water mixture from an organic compound selected from the group consisting of C<sub>1</sub> to C<sub>6</sub> carboxylic acids, ketones having boiling points from 154°C to 170°C, and esters having boiling points from about 168°C to about 250°C, the process comprising combining the organic compound with water under conditions of agitation to form a mixed solution of the organic compound and water having a consistent concentration of water comprising from about 100 ppm to about 50,000 ppm water to produce the color stable organic compound/water mixture, wherein the color stable organic compound/water mixture has an APHA color value of 15 or less after being boiled for at least one hour at one atmosphere of pressure.

3. *Grekel et al.* '347 does not disclose or suggest a process for making organic compound/water mixtures to form a mixed solution having a consistent concentration of water. The '347 patent is concerned with separation and uses water as a separation aid, unlike the subject invention which is not concerned with separation. In fact, the '347 patent produces "anhydrous" products, which is opposite the Subject Invention. The Subject Invention uses water to suppress unwanted, color-generating reactions. The amendments to the claims clearly exclude the '347 reference for numerous reasons. Since the reference describes organic compound/water mixtures in a distillation column, the relative concentration of the organic compound/water components will vary with height in the column, that is, will not be consistent. Furthermore,

the reference teaches production anhydrous products, not aqueous compositions. *See* Col. 2, lines 55-59, as well as Col. 7, lines 69-73; quoted below:

The point in the column at which the make-up water is added is immaterial as long as it is not introduced at a level so low in the column that it will interfere with the production of *substantially dry acid* at the base of the column.

(Col. 2, lines 55-59)

To obtain highly purified n-butyric acid from the dry acid mixture mentioned immediately above, said mixture is fed to a third column operated at a bottoms temperature of 157.8°C. (635 mm.) and at a top tower temperature of 138.9°C (500 mm.).

(Col. 7, lines 69-73).

I further note that the impurities that are believed to cause color do not azeotrope with water, and the process of '347 patent would be ineffective to remove them in any case. The actual production processes involved in producing butyric acid and other organic compounds typically use water and other additives in the process which are ineffective to remove color causing impurities in the finished product; which is why the Subject Invention adds water after the production is complete.

4. The Subject Invention resides, in part, in the discovery that adding water to a finished organic compound can greatly enhance APHA color characteristics. This discovery was unexpected and is very useful since superior color is achieved without expensive additional processing steps. Examples 5-7 of the above-noted application as filed are illustrative:

#### Examples 5-7

The effect of color improvement though the addition of water was determined on three samples from a commercially produced butyric acid run. The samples were prepared by successive distillations of the same portion of the commercially produced

butyric acid run. The APHA colors of the samples were determined to be as follows:

Example 5     13  
 Example 6     3  
 Example 7     1

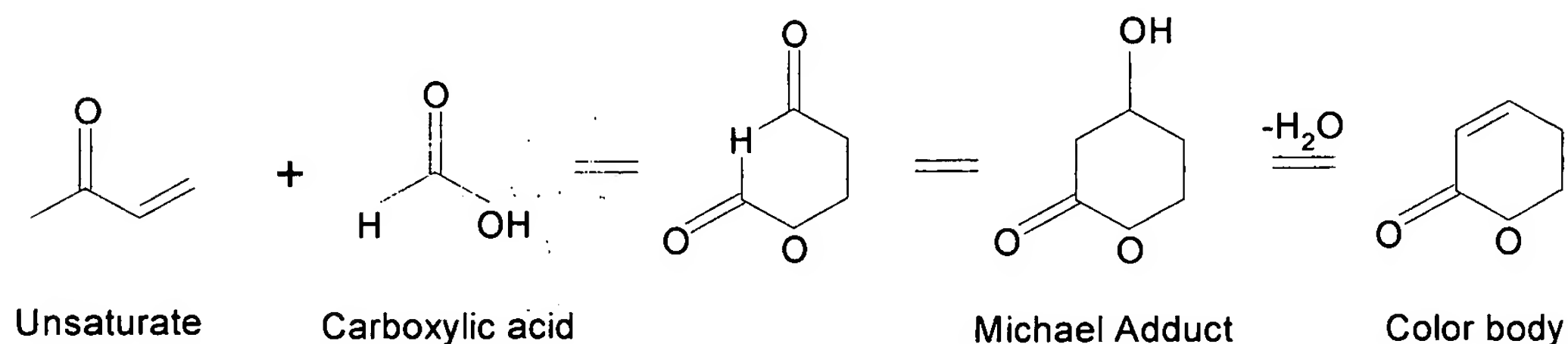
The color variance of the samples is attributable to the fact that more color bodies were present in the first distillation sample as compared to the second and third distillation samples.

To each of these samples was added 20,000 ppm, water while stirring at room temperature, to ensure uniform distribution of the water. Following addition of the water, the APHA colors of the samples were determined as follows:

Example 5     1  
 Example 6     1  
 Example 7     1

5. Without intending to be bound by theory, it is believed the invention operates, in part, as described on page 9, lines 3-11:

It is believed that a compound formed from an unsaturated ketone and a carboxylic acid in the production of the relevant organic compounds leads to formation of a Michael Adduct in accordance with the following reaction process:



As seen from this reaction process, the Michael adduct, upon dehydration, yields color bodies thought to lead to the undesirable darker color products. It is believed that by adding water to the organic compound products, formation of the color bodies is prevented.

6. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made, are punishable by fine, or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated 8/9/06

Kenneth Allen Windhorst  
Kenneth Allen Windhorst

Linda D. Hornsby  
Notary X

